

Honors Chemistry - Stoichiometry Problem Set

Stasya

1. Write and balance the equation and solve the problems.

(a) Ethanol, $\text{C}_2\text{H}_5\text{OH}$, is produced when glucose, $\text{C}_6\text{H}_{12}\text{O}_6$ ferments. The other product is carbon dioxide.

(b) How many moles of glucose must ferment to produce 7.5 moles of ethanol?

(c) How many moles of carbon dioxide will be produced as a byproduct?

2.

(a) Write the balanced equation for the decomposition of sugar, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, into carbon and water.

(b) How many moles of sugar would you have to start with to end up with 8.7 moles of carbon?

(c) How many moles of carbon would be produced if you started with 2 moles of sugar?

3. How many grams of C_5H_{11} must be burned to produce 1.25 moles of water?

4. Sucrose, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, decomposes into carbon and water vapor. If 4.00 g of sucrose decomposes, how many grams of water vapor are produced?

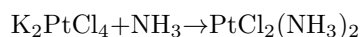
5. A gas at STP occupies 4.38L. How many moles of gas are there?

6. A 6.8 mole sample represents how many formula units of Na_2CrO_4 ?

7. What is the limiting reagent when 7.4 moles of calcium reacts with 10.6 g of water to produce calcium hydroxide and hydrogen?

8. What is the % yield if 4.30 g of potassium is reacted with an excess of iodine and 13.78 g of potassium iodide is formed?

9. The compound "cisplatin", $\text{PtCl}_2(\text{NH}_3)_2$ is effective in treating some types of cancer. It can be synthesized using the following skeleton equation:



Suppose a researcher needs exactly 5.00 grams of cisplatin for an experiment. How much K_2PtCl_4 would she need to start with, assuming she has an excess of ammonia?

10. How many liters of oxygen gas can be obtained from the thermal decomposition of 500.0 g of potassium chlorate? How many grams of the other product are formed?

11. What numbers do you use in a conversion between moles and moles?

12. What numbers do you use in a conversion between moles and grams?

13. Reactions between an acid and base always form a "salt" and water. "Salt" is a generic term used to describe an ionic compound. When phosphoric acid and calcium hydroxide react, calcium phosphate is the salt formed. If you wanted to obtain 5.5×10^{20} formula units of the salt, how many grams of phosphoric acid would be needed?

14. Barium nitrate and sodium sulfate solutions can be used to precipitate barium sulfate. How many moles of sodium sulfate should a chemist use to completely react with 75.0 grams of barium nitrate?

15. Write a balanced equation for calcium carbonate and nitric acid.

16. Using the equation above, if a chemist performs this experiment and collects exactly 2.0 liters of carbon dioxide, determine her percent yield.